



CLEAN ENERGY REWARDS

CLEAN ENERGY REWARDS PROGRAM
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY, MARYLAND

Wind Energy

Where does wind come from?

Wind is actually caused by the sun. As the sun warms the earth throughout the day pockets of hot air close to the earth rise causing pockets of cooler air to sweep in and fill the space. This rising and sweeping effect creates wind. Because the earth is spinning these pockets of air keep circulating around the globe creating wind and changing weather.

How does wind make electricity?

Wind is kinetic energy, or moving energy. That is why leaves move in the breeze -- they are being acted upon by the wind. Similarly the blades of a wind turbine move when the wind blows, but they won't make a mess of your yard -- they make electricity!

Wind turbines are tall to take full advantage of increased air speeds higher off the ground. Most turbine blades will begin to rotate as the wind reaches 11 mph, or about enough wind to extend a flag. The blades are connected to a system of shafts and gears which are hooked up to a generator inside the turbine's housing. As the blades rotate, the gears start to move and operate the generator. That makes electricity! The electricity is then transferred to the grid. You can see all the parts inside a wind turbine at: http://www1.eere.energy.gov/windandhydro/wind_how.html

How is wind energy delivered to my house?

Well, actually, it isn't delivered directly to your house. Once energy enters the grid, the distribution system that gets electricity from the point of generation to your outlet, it can not be traced. So you are not getting the exact electrons that were generated by a wind

turbine. What you are getting is a mix of electricity generated from several different sources, one of which is wind.

Because you chose to purchase wind energy, a higher percentage of the energy mixed together in the grid is from wind. More wind generation means that less energy was generated from fossil fuels. Your decision to purchase wind energy offsets energy produced by fossil fuels and helps to decrease the amount of greenhouse gases released into our air.

Where is wind electricity produced?

The US is fortunate to have a large capacity for wind energy generation. Today the US has over 10,000 megawatts of generating capacity. This is more energy than needed to power all the homes in Maryland (2.5 million homes), and the capacity is increasing rapidly. California has the most wind power, followed by Texas, Minnesota, and many mid-western states. Pennsylvania and West Virginia also have a substantial number of wind farms and several planned projects.

Where does my wind energy come from?

By choosing a product from a supplier participating in Clean Energy Rewards you can be sure the wind energy you purchased is generated in the Mid-Atlantic region. There are several wind farms in West Virginia, Pennsylvania, Ohio, Illinois, and New Jersey that contribute to our regional power supply. All of the electricity you purchase from wind generation offsets the electricity that would have been produced by fossil fuels and decreases the amount of carbon dioxide and other greenhouse gases released into our air.



What are the benefits of electricity generated from wind?

It's clean!

Wind is a readily available resource; it does not have to be mined, transported, or refined in order to generate electricity. Since the turbines do not burn fossil fuels there is no bi-product from the generation and no pollutants are emitted into the air. A big benefit, however, is that as more electricity is generated from wind, less electricity is generated from fossil fuels. So wind energy decreases the amount of greenhouse gases emitted by reducing the amount of electricity production necessary from fossil fuels.

For example, did you know that the electricity generated from a single 1 megawatt wind turbine for 20 years would require burning 29,000 tons of coal? You can visualize that as a line of 10-ton trucks filled with coal stretching from Bethesda to Rockville on Route 355! Using wind instead of coal keeps carbon dioxide out of our air pollutants out of our water.

It's healthy!

Did you know that the air quality in the Baltimore/Washington region has the distinction of being the 12th worst in the nation? Did you also know that our waterways have some of the highest mercury contamination in the nation too? Well guess what? Energy generation from fossil fuel sources like coal, natural gas, and oil are partially responsible for those staggering statistics.

Energy generation is responsible for 34% of the pollution in the US. A big part of this pollution is particulate matter. The soot (carbon) in the air exacerbates health problems like asthma and lung disease. Additionally, some plants like ragweed, an allergen for many people, love carbon dioxide. The more carbon dioxide in the air, the more pollen the plants produce. Allergic reactions to increases pollen levels make some individuals extremely uncomfortable and it affects their productivity.

Energy generated by burning fossil fuels also releases mercury. Once mercury is in our environment it is very

Sources include:
American Wind Energy Association
National Renewable Energy Laboratory, National Wind Technology Center
US Department of Energy

difficult to sequester. It contaminates our water and builds up in fish, and then contaminates the humans that eat the fish. Humans exposed to too much mercury have nervous system problem later in life, and if affected by high doses of mercury while pregnant, mercury could cause birth defects. Choosing a clean energy generation source, like wind, ensures that fewer fossil fuels are burned to produce energy and fewer pollutants are released affecting our water and our food.

It has little impact on nature!

You may have heard that wind farms kill birds. Well, it's true. Buildings, cars, cats, high tension lines, and pesticides also kill birds, and these causes of bird deaths are hundreds of times greater than those of wind farms. As new wind farms are proposed studies of migratory paths and habitats are conducted to ensure that the farm is placed in an area that will have minimal impact on the creatures that call it home. Even The Audubon Society is a large purchaser and advocate of wind power and supports properly sited wind farms.

Wind farms have small footprints when compared to other forms of energy generation. Coal plants and mines, oil refineries, natural gas plants need acres, if not miles of dedicated lands in order to function. Hikers, bikers, and even farmers can continue to use the land surrounding wind turbines.

It's good for our economy and independence!

With the growth of wind farms comes new jobs -- wind farms provide more jobs per dollar invested than any other energy technology!

Since you can't put a price on wind, the cost of wind energy is not likely to fluctuate like the cost of energy from fossil fuels. In fact, electricity from wind has decreased from nearly 40¢/kWh to 4-6¢/kWh in just 20 years due to advances technology, and it is likely to keep falling.



Clean Energy Rewards Program / www.montgomerycountymd.gov/cleanenergyrewards

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